Canadian Model Forest Network

Local Level Indicators
Gap Analysis

Martin von Mirbach
Centre for Forest and Environment Studies

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Canada has taken the lead in researching ways to sustain and enhance our forests. The Government of Canada, through the Canadian Forest Service, initiated the Model Forest Network in 1992. It introduced this system of 11 Canadian and a number of international research sites "dedicated to building partnerships locally, nationally, and internationally to generate new ideas and on-the-ground tools for sustainable forest management". This process has brought together hundreds of partners including academia, industry, government, communities, aboriginal peoples, the public, and other stakeholders.

The Canadian Forest Service of Natural Resources Canada is also a principal partner in each of the eleven model forest organizations and provides primary funding and administrative support to Canada's Model Forest Program.

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What is a Model Forest?

A model forest is a place where the best sustainable forest management practices are developed, tested and shared across the country. Each model forest is run by a not-for-profit organization, and, except for a small administrative staff, all those involved in the model forest not only donate their time and expertise, but usually bring additional financial support.

At the heart of each model forest is a group of partners having different perspectives on the social, economic and environmental dynamics within their forest – perspectives that are necessary to make more informed and fair decisions about how to manage the forest. The real "model" in these forests is the way the different partners – logging companies, Aboriginal communities, maple syrup producers, woodlot owners, parks, environmentalists, universities, government agencies, recreational groups, community associations, hunters, trappers - have integrated their own interests into their common goal of developing approaches to sustainable forest management that do not sacrifice one interest for another.

Although the model forest organization itself does not have jurisdiction over the land it uses as a testing ground, those who do have jurisdiction are participants. By being involved from the outset in developing new, on-the-ground approaches and solutions for sustainable forest management, those with land management responsibilities are increasingly adopting many of the model forest suggestions.

Model Forest Network web site: **www.modelforest.net**

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The Canadian Model Forest Network:

Local Level Indicators Gap Analysis

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Summary

Each Model Forest in Canada entered its second phase (or, in the case of the Waswanapi Cree Model Forest, its first phase) with a commitment to develop, measure and report on appropriate local level indicators (LLI) of sustainable forest management (SFM). At the same time, the Model Forest Network created a "Strategic Funding" component of the Model Forest Program, intended to facilitate collaborative work among and between Model Forests, to promote synergies through such collaboration, and to support network leadership in the effective sharing of knowledge. There has been a strategic initiative related to LLI in place since July 1997.

This "Gap Analysis" has been prepared in order to summarize the state of development and application of LLI across the Model Forest Network; identify needs, barriers and challenges; and to recommend options and opportunities for future actions, in particular through network strategic initiatives.

Much has been accomplished across the Model Forest Network in the previous eighteen months. Each Model Forest has an initial set of indicators, and has either completed or is close to completing a refined set. Many Model Forests are well underway in the task of gathering data on these indicators, and are developing and implementing plans to monitor and report on these indicators on an ongoing basis. Perhaps more significantly, Model Forests and their Partnerships now have a much better understanding of how LLI are an essential aspect of SFM, and how they can be used to help sharpen the focus of the work being carried out by Model Forests. These important benefits have come about as much through the *process* of discussing, developing and using local level indicators as through the indicators themselves.

The Network played a significant role in the progress that has been made. It facilitated knowledge transfer between Model Forests, both through the various meetings and workshops that were held, as well as through various "twinning" projects or visits. In some cases there were particular benefits to certain Model Forests that had the opportunity to learn from what other Model Forests had already accomplished. In many other cases, however, it was more of a shared, collaborative process, in which Model Forests worked jointly to address common problems.

Work is currently proceeding at a steady pace in all Model Forests. All Model Forests are dealing with the challenge of gathering data on the selected indicators. In other respects, Model Forests are at varying stages in their process, and are in many cases pursuing different objectives when it comes to applying LLI. LLI are being used by various Model Forests or their Partners to: build computer forecasting models; develop, review and assess management plans; identify target or thresholds; develop management objectives; obtain certification; guide further research; assess the overall state of SFM; and assess the impact that the Model Forest is having.

Of particular note is the progress that has been made at applying local level indicators - or, more usually, LLI methodology - outside of the immediate area of the Model Forest. This has been done primarily through commitments by Model Forest Partners (both private sector as well as provincial

governments) to apply what they have learned through the Model Forest process across the entire land bases that they are responsible for.

Until now strategic networking activity related to LLI has focused primarily on meeting the immediate needs of Model Forests; raising people's levels of understanding and addressing common problems in the selection of appropriate indicators. While there is some activity currently underway to determine appropriate indicators relating to socioeconomic values as well as traditional ecological knowledge, it is nevertheless the case that the indicator selection stage of the LLI process is more or less complete, with the possible exception of a few Model Forests that may require a bit of assistance to get up to speed.

The task of gathering specific data will present a significant challenge to all Model Forests, but the Network's role in actual data gathering is likely to be modest. The research into socioeconomic indicators is one example of where the Network is able to take advantage of significant efficiencies when it comes to "mining" data available from Statistics Canada. In most cases, however, the sources of the data are closer to the Model Forests, and so collaboration provides fewer economies of scale.

There are significant opportunities for strategic networking, however. The Network has an important role to play in sharing information about a number of challenges related to the monitoring, stewardship and interpretation of data. The Network can provide the means for discussing, developing, refining and validating the *methods, protocols* and *techniques* used to meet these challenges. This will improve both the quality and the efficiency of the work carried out by individual Model Forests.

The development and application of local level indicators is a rapidly evolving field, involving many different agencies, and it will take ongoing and rigorous effort if the Model Forest Network is to continue to be recognized for its leadership. Model Forests can't afford to become complacent about past achievements, and the Network can help to stimulate everyone to continually improve upon their record of accomplishments.

Perhaps most significantly, the Model Forest Network can stimulate genuinely strategic initiatives by focusing greater attention both *forward* and *outwards*. It can do this in three main ways:

a) The Network can help to facilitate the effective dissemination and broader application of Model Forest accomplishments with respect to LLI.

b) The Network can forge strategic linkages with agencies responsible for international and national reporting on C&I, provincial reporting processes, provincial requirements for monitoring and environmental auditing, and voluntary certification at the forest management unit level.

c) The Network can anticipate and meet future challenges. One particular challenge (closely related to the linkages referred to above) is the need for a core set of useful, valid indicators that is mutually recognized by a wide variety of agencies concerned with local level indicators of SFM.

The Model Forest Program has a number of characteristics that make it well suited to play a leadership role in SFM. It comprises forests with a wide diversity of ecological and socioeconomic characteristics, and includes within its membership a tremendous diversity of Partners and partnership arrangements. In order to fulfill its leadership potential, however, it will be necessary to revisit and revise the way that LLI strategic initiatives are developed, approved and implemented. The current process has proven to be too cumbersome to be as effective as it could be, with responsibilities too dispersed for true accountability to take place.

This report proposes that the Local Level Indicators Working Group be replaced by a somewhat smaller committee, including representation from within as well as outside of the Model Forest Program. This new committee makeup will encourage committee members to put more of their energy into the "big picture" strategic issues. The Committee would be supported by dedicated coordination services, which would ease the burden on General Managers and others who are currently expected to manage projects with active collaboration from across the Model Forest Network, an impossible task for people who already have more-than-full-time responsibilities to their own Model Forests.

The recommendations that arise from this gap analysis are listed below. They are discussed in greater detail in the report itself, and for ease of reference the particular section number is provided in parentheses following each recommendation.

Overarching recommendation

1. Provide the LLI Strategic Initiative with a renewed mandate and a more forward-looking focus, with the following specific goals:
   a) facilitate knowledge transfer across the Model Forest Network;
   b) foster leadership, excellence and continual improvement;
   c) promote the broader dissemination and application of the LLI work being done by Model Forests; and
   d) forge strategic linkages with other relevant initiatives. (4.0)

Recommendations to facilitate knowledge transfer

2. Share information on indicators related to public participation. (2.2.1)

3. Share information on how Model Forests are assessing indicators for their overall usefulness, including examples in use outside of the Model Forest Network. (2.2.2)

4. Share information, on an ongoing basis, about how Model Forests are defining indicators in specific units of measure. (2.3.1)

5. Establish an appropriate forum to analyze specific challenges related to data gathering, long-term monitoring, interpretation and data stewardship; and to discuss and develop common approaches and solutions. (2.3.4)

Recommendations to foster leadership, excellence and continual improvement

6. Encourage Model Forests to submit their suite of local level indicators to a standardized peer review process that would assess the overall set for its comprehensiveness, credibility and validity. (2.2.3)

7. Carry out an independent survey of stakeholder and public interest groups in a few Model Forests that are using LLI in management planning, to assess the acceptability of the indicator sets used and the overall process being followed. (2.2.3)

8. Develop a "smart set" of between 5 and 15 indicators, common to most or all Model Forests and sufficiently broad in scope to give an approximation across the entire range of CCFM criteria. (2.3.5)

Recommendations to promote broader dissemination and application of LLI

9. Develop and publish, at the national level, a "how-to" guide to using LLI, incorporating as "case studies" the strongest elements from all Model Forests, explaining and demonstrating diverse approaches to identifying indicators, evaluating them, gathering data and applying information in forest management planning and reporting. (2.7)

10. Closely track the influence that Model Forest LLI activities are having outside of the Model Forest area. (2.6.4)

Recommendations to foster strategic linkages with other agencies involved in C&I

11. Commission a discussion paper that identifies all major SFM indicator initiatives in Canada and explores opportunities to:
    a) improve indicator reporting through the sharing of valid LLI frameworks;
    b) harmonize methodologies and protocols;
    c) encourage consistency or convergence where appropriate; and
    d) minimize duplication wherever possible. (2.6.5)

12. Forge strategic linkages with organizations in Canada that are involved in C&I or LLI,

including the Canadian Council of Forest Ministers, the Canadian Standards Association and the Forest Stewardship Council. (2.6.5)

Recommendations to improve the overall functioning of the Network's LLI Strategic Initiatives

13. Replace the Local Level Indicators Working Group with a Joint Advisory Committee on Local Level Indicators, responsible for providing overall guidance on strategic initiatives related to LLI. Membership would consist of:

    - three General Managers or Model Forest LLI experts;
    - one Model Forest President;
    - two representatives (national and regional) from the Model Forest Secretariat;
    - one representative from the Canadian Standards Association's SFM Technical Committee;
    - one representative from the Forest Stewardship Council Canada;
    - one representative from the national C&I Coordinating Committee; and
    - one representative appointed by the upcoming Chair of the CCFM. (3.3.1)

14. Prepare an LLI Strategy and Implementation Plan. (3.3.2)

15. Establish a Networking Coordinator, whose duties would include liaising on an ongoing basis with all Model Forests, managing or coordinating projects carried out as LLI Strategic Network Initiatives, and acting as a Secretariat to the Joint Advisory Committee on LLI. (3.3.3)

1.0 INTRODUCTION

1.1 Background

The pursuit of sustainable development in forestry has led to the identification of a basic set of conditions and processes that characterize Sustainable Forest Management (SFM). In Canada these criteria are, as defined by the Canadian Council of Forest Ministers (CCFM 1995):

1) Conservation of biological diversity;
2) Maintenance and enhancement of forest ecosystem condition and productivity;
3) Conservation of soil and water resources;
4) Forest ecosystem contributions to global ecological cycles;
5) Multiple benefits to society; and
6) Accepting society's responsibility for sustainable development.

An indicator is an attribute or aspect of a criteria that can be measured to describe a component of the criteria's state or condition. Repeated measurements of indicators are used to describe trends. Taken together, criteria and indicators provide a framework for describing the state of forests and forest management and for measuring progress in achieving SFM.

While some indicator sets have been developed and promoted at the national and international scale, Model Forests are ideally suited to describe and effectively measure indicators at the local forest management level. As part of the Proposal Guidelines for Phase II of Canada's Model Forest Program, each Model Forest was required to prepare a five year plan to create and incorporate local level indicators (LLI) of SFM (CFS 1996).

In addition to the individual Model Forest indicator activities, the Strategic Funding component of Phase II was intended to intended to facilitate collaborative work among and between Model Forests, to promote synergies through such collaboration, and to support network leadership in the effective sharing of knowledge.

1.2 Purpose and Methodology

The present report is intended to:

1) summarize the state of development and application of LLI at each of the eleven Model Forest sites across Canada;
2) assess the achievements to date;
3) identify needs, barriers and challenges; and
4) recommend options and opportunities for future action, in particular through Model Forest Network strategic initiatives.

The analysis is based primarily on information from the Model Forests themselves, and from people directly associated with the Model Forests. Information was gathered by the following means:

1) a search through the files of the Canadian Forest Service (CFS) offices in Ottawa;
2) a request for copies of reports, etc, from individual Model Forests;
3) an "Objectives Matrix" was sent to all General Managers, asking them to identify their high priority objectives and to assess the level of current and planned activity in fulfilling each of these objectives; and
4) twenty-six people were interviewed, including all General Managers[1] and all regional coordinators for the Canadian Forest Service (CFS) with responsibility for the Model Forests in their region.

1.3 Structure

Section 2 of this report focuses on work that has been and is being done in individual Model Forests. The section is organized according to the various tasks common to all Model Forests (identifying, measuring and reporting on indicators), with additional sections reviewing achievements made in implementing LLI, based roughly on the framework contained in the Objectives Matrix. Interspersed throughout this summary of achievements is commentary on challenges faced, needs and gaps identified, and recommendations for how strategic networking initiatives might help to address those gaps and needs.

Section 3 focuses on the accomplishments of the Local Level Indicators Working Group, and explores ways to refocus the structure and operations relating to strategic network initiatives in support of LLI.

Recommendations are scattered throughout the report, appearing where they are most relevant. They are grouped together in the Summary, and the number attached to each recommendation relates to the order in which it appears in the Summary, which is different from their order in the text of the report.

Appendix A provides a brief Status Report on each Model Forest, identifying the high-priority objectives and briefly listing the main accomplishments and future plans.

Appendix B provides a summary of the results of the "Objectives Matrix" survey, showing which Model Forests are pursuing common specific objectives, and their levels of activity.

Appendix C lists the sources consulted in preparing this report, including written materials as well as a list of interviewees and others who provided their input.

[1] The GM position at Lake Abitibi Model Forest was vacant at the time this report was being prepared.

1.4 Acknowledgments

I'd like to express my great appreciation to the many people who took the time to fill in the Objectives Matrix, talk to me on the telephone, and to send me valuable information. Their names are listed in Appendix C. Dan Welsh and Dean Toole reviewed the draft report and provided valuable comments. As well, I am grateful for the support and advice I received from John Hall, Director of the Model Forest Program; and for the helpful assistance provided by Marie-Anick Liboiron and Joanne Pugin at CFS, and by Brenda Joy at the Centre for Forest and Environmental Studies. While I have benefitted enormously from the information provided to me over the course of carrying out this research, I know that there will be errors and omissions in it, and these are my responsibility. As well, the views expressed in this report are not necessarily the views of the Canadian Forest Service, the Model Forest Network, individual Model Forests, Model Forest Partners or their cats. If there are good ideas in this report, I am pleased to share credit with the many people who discussed their views with me; the blame for the bad ideas can be laid at my doorstep.

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2.0 LLI WORK CARRIED OUT BY MODEL FORESTS

2.1 Introduction

With the hindsight of two years, the Phase II Proposals that were prepared by each Model Forest in early 1997 show that there was at the time a fair amount of confusion about the topic of criteria and indicators. The proposals refer to concepts such as adaptive management, certification, benchmarks, etc, but it is not always entirely clear how these different concepts relate to each other and to the development and use of LLI. The Five Year Action Plans developed by each Model Forest often include lists of specific actions, but it was perhaps not clear at the time *who* would be carrying out these actions, *why*, on behalf of *whom*, and for *what* ultimate purpose. Or, it might be more correct to say that while *some* people involved in the Model Forest partnership *thought* that these concepts were fully understood, there was still considerable confusion amongst the partnership as a whole.

Table 1: Model Forest Abbreviations

WNF	Western Newfoundland
FUN	Fundy
BSL	Bas Saint-Laurent
WAS	Waswanapi
EON	Eastern Ontario
LAB	Lake Abitibi
MB	Manitoba
PA	Prince Albert
FTH	Foothills
MCG	McGregor
LB	Long Beach

Based on the input received during this gap analysis project, it seems as though there is now a significantly better understanding of how local level indicators might be used and applied in order to meet a variety of different objectives. In particular, most Model Forests recognize that there is no single approach that is best suited to meet all of the possible objectives or applications that LLI might be applied to. Appendix A provides a brief "Status Report" from each Model Forest, which is no more than a crude snapshot but is intended to help provide a general overview of the accomplishments made by each Model Forest. Appendix B provides a summary of the input received from Model Forests regarding which particular areas they are concentrating on in their LLI work. It should prove helpful in identifying "like-minded" Model Forests that share particular interests, and are either at a similar stage in their development of these objections (allowing for collaboration) or at different stages (allowing for knowledge transfer).

According to the Proposal Guidelines prepared by CFS, each Model Forest entering into a Phase II agreement was expected to have completed the following activities related to LLI by March 1999:

1) identify and finalize a set of local indicators;
2) carry out Initial measurements to establish benchmarks; and
3) communicate the initial status of all indicators.

Table 2 describes the current status or expected completion dates of these tasks across the Model Forest network.

Table 2: Current Status of Model Forest LLI Activities

Model Forest	Initial indicator set	"Refined" indicator set	Initial data collection	Communication of data
Western Newfoundland	done	03/99	05/99	05/99
Fundy	done	1999/2000	ongoing	ongoing
Bas Saint-Laurent	done	05/99	10/99	12/99
Waswanapi Cree	done	to be determined[2]	to be determined	to be determined
Eastern Ontario	done	done	03/99	03/99
Lake Abitibi	done	03/99	10/99	11/99
Manitoba	done	05/99	05/99	05/99
Prince Albert	03/99	08/99	08/99	10/99
Foothills	done	05/99	09/99	03/00
McGregor	done	05/99	05/99	2000
Long Beach	done	08/99	10/99	10/00

It's important to note that the distinctions made in this Table are somewhat arbitrary, and Model Forests may not have interpreted them the same way. "Initial set" was intended to describe a set of indicators that has gone through an initial adaptation to fit it into local requirements. A "refined set" comes about after a further iteration, and is referred to variously as a "functional," "core," "starter set," "validated," etc. FUN is likely using "refined" to mean indicators that have been "field-tested," which is a stricter definition than that used by other Model Forests. The term "Initial data collection" is also somewhat fuzzy. In other words, the table gives a broad overview of the progress being made across the Model Forest Network, but isn't necessarily reliable for making comparisons between individual Model Forests.

2.2 Indicator Selection

Indicator selection can be broken down into three tasks:

a) prepare an initial list of indicators;
b) assess them for validity, relevance, practicality, etc; and
c) develop a refined list of indicators.

[2] The Waswanapi Cree Model Forest is still in the process of engaging its partnership in discussions and decisions regarding specific commitments to the development and use of LLI.

Progress made: Each Model Forest has or will soon have both an initial set of indicators as well as a more refined set. In some instances they have been developed by consultants (LAB) or separately from the Model Forest partnership (WAS), and have not yet been fully validated by the partnership. Some Model Forests started with existing indicator lists and worked to make them relevant to their situation. FUN started with the CCFM national set, while PA is also using lists prepared by the Province and by the National Aboriginal Forestry Association. Other Model Forests (e.g., WNF) were less systematic and worked more like magpies, picking up shiny-looking indicators from a variety of different sources, but not constrained to evaluate or even consider any other entire list.

Current status: All Model Forests are continuing to assess, refine and modify their indicator sets. These are understood by all Model Forests to be ongoing activities. In particular, "assessing" indicators involves a variety of different tasks. Assessing an indicator for *practicality* ("Can we obtain this data?") typically involves evaluating existing data sets and/or estimating the cost and feasibility of gathering new data. Assessing the *credibility* ("Does this indicator reliably tell us what we want to know?") is a quite different process, and may involve a literature review and/or a field trial. Assessing the *validity* ("Can this indicator be usefully applied?") involves assessing a combination of factors to determine whether or not there is a commitment to use the indicator.

Challenges: The fact that assessment and refinement are both ongoing processes has made it hard for Model Forests to draw a line and say that *this* particular set is the set that they will measure and report on. Within Model Forest partnerships there is a creative tension between the "perfectionists," who want to continually make improvements, and the "pragmatists" who want to get on with things and make do with the best currently available information. To report on indicators is to take a kind of "snapshot" (which may involve reporting on trends as well as fixed data points), but it's not always easy to agree on when the subject is sufficiently in focus to click the shutter, or even where the camera should be pointing.

2.2.1 Filling in "gaps" in indicators

Several Model Forests identified the need for particular attention in refining indicators related to the following:

- socio-economic values
- traditional ecological knowledge (TEK)
- socio-*ecological* values (is this the same as TEK?)
- public participation

The Model Forest Network is already in the process of carrying out investigations on socioeconomic indicators as well as TEK, and it is hoped that the results of this work will support Model Forest needs. The topic of how to use good indicators of public participation is relevant across the Model Forest Network, however, and is worth exploring further, although it likely does not require a dedicated research initiative.

Recommendation #2: Share information on indicators that relate to public participation.

2.2.2 Sharing methods for assessing indicators

Now that most Model Forests are nearing the completion of the first stage of evaluating and refining indicators, it may be an appropriate time to share information about how Model Forests are assessing indicators for their overall usefulness, including factors such as practicality, relevance, validity, applicability in the field, etc.[3] Some Model Forests that were slower to get started with their LLI work (e.g., LAB, LB) have benefitted from the work that has gone on before, and may in some respects have "leapfrogged over" other Model Forests in terms of the sophistication of their approach to assessing potential indicators and developing a monitoring protocol. The relative knowledge bases of Model Forests have shifted rapidly in the past year, and since all Model Forests are continuing to review, refine and revise their indicators, there is much that could be learned in sharing advances that have been made in this subject in the past year, including work done by other agencies, such as CIFOR (Woodley).

Recommendation #3: Collect and share information on how Model Forests are assessing indicators for their overall usefulness, including examples from outside of the Model Forest Program.

2.2.3 Reviewing and assessing entire *suites* of indicators

There has been considerable attention paid to individual indicators, but by focusing on this level of detail what is sometimes overlooked is the big picture; namely the need to assess and refine entire *sets* or *suites* of indicators. The truly important test of any Model Forest's LLI work should be the credibility, validity, practicality and acceptability of the entire *suite* of indicators. In particular, a number of questions need to be asked:

1. Does the set of indicators for a particular criterion or value give a *comprehensive* measure of the extent to which that particular value is being addressed or accounted for? (Are *all* significant components of the criterion covered, or only some of them? Is there sufficient breadth?)
2. Does the set of indicators for a particular criterion or value give a *credible* measure of the extent to which that particular value is addressed or accounted for? Are the assumptions made scientifically sound, or at least both reasonable and testable?

[3] Different Model Forests use different terms to describe this assessment, including "functionality," "validity," etc.

3. Does the set of indicators make a *valid* link between the individual indicators and management activities that might influence these indicators? Is this link as clear and unambiguous as possible, given the complexity of the interactions inherent within SFM? How might this link be strengthened?
4. Is the set of indicators *acceptable*? Are managers, decision-makers, stakeholders and interested publics prepared to accept this set of indicators, and to use them as a basis for management, evaluation and review?

Recommendation #6: Encourage Model Forests to submit their suite of local level indicators to a standardized peer review process that would assess the overall set for its *comprehensiveness, credibility* and *validity.*

Some Model Forests may feel that their diverse partnerships already constitute an adequate peer review, and that a separate review is therefore unnecessary. It should, however, be seen by most Model Forests as a valuable exercise, providing a fresh perspective and constructive suggestions for improving the overall framework. To be truly effective, a consistent methodology should be applied to all of the reviews. They could be carried out by a small team of competent experts, including people with good knowledge of the Model Forest Program but removed from direct involvement in the specific indicator sets being reviewed.

A peer review is the best way to assess the scientific validity of a set of indicators, but the question of overall *acceptability* is best addressed by survey methods.

Recommendation #7: Carry out an independent survey of stakeholder and public interest groups in a few Model Forests that are using LLI in management planning, to assess the *acceptability* of the indicator sets used and the overall process being followed.

Such a survey should take place only after the initial management planning cycle using LLI (e.g., to set objectives, to develop scenarios) has been completed, and the resulting plan is being implemented. The survey would measure the extent to which managers, stakeholders and interested publics in the Model Forest area agree that these LLI provide a good basis for management, evaluation and review.

2.3 Measuring Indicators

Having an indicator is not the same thing as having good, accurate, up-to-date information for that indicator. Data collection is obviously an essential component of LLI work, vital both for initial

reporting as well as for ongoing monitoring.

Progress made: Several Model Forests (FUN, MCG) report that their data gathering efforts have been proceeding in parallel with the refinement of indicators, but as of this writing no Model Forests have released the results of their data collection beyond their partnerships. EON will likely be the first to do so, with a State of the Forest Report expected in March 1999.

Current Status: There are several different possible approaches to gathering data on indicators, including:

- Developing protocols for field work (such as is being done by LB);
- Exploring cost-effective ways to gather data without having to depend on collection in the field (e.g., BSL, FUN);
- Seeking partnerships for monitoring on a long-term basis (e.g., MB); and
- Collecting and reporting on existing data (e.g., EON, WNF).

Most Model Forests are doing, or at least exploring, some combination of the above approaches, but with greater or lesser emphasis depending on their particular needs and constraints. The Model Forests with extensive small-forest ownership (FUN, BSL, EON), for instance, can't really contemplate carrying out systematic field work on those lands. Using existing data is the best way to produce and disseminate information in the short term, but the overall credibility of the work may suffer due to limitations in the breadth or validity of the information available. A long-term approach is more likely to be scientifically sound, but risks getting stuck at the conceptual level and not implemented.

Challenges: There are a number of critical challenges, in addition to the ones touched on above:

2.3.1 Getting from "indicator" to "measure"

Many valid indicators are still expressed in very general terms, and must be rephrased as specific measures before they can be applied. For example, "area of suitable habitat for selected species" is an oft-used indicator, but before data can be collected a number of questions need to be addressed:

- Which species are you selecting, and why? Are you selecting the species because it's a good indicator species, or simply because you have information about it?
- What is the appropriate measurement interval and scale?
- What, exactly, is "suitable habitat?" Suitable for what portion of an animal's requirements? Is a piece of land either suitable or not, or is there a range of "suitability indices?"
- What level of accuracy is required? How do you deal with areas of uncertainty?

Answering these questions within the real world of limited time frames and budgets often results in compromises that may critically reduce the usefulness of that indicator.

Recommendation #4: Share information, on an ongoing basis, about how Model Forests are defining indicators in specific units of measure.

Indicators that are in widespread use across the Model Forest Network, and that still require considerable refinement before they can be defined as actual measurements, include the following (Holmes 1998):

- Area of suitable habitat for selected species (Criteria 1 and 5);
- Water quality/hydrometric data (Criterion 3);
- Carbon storage in vegetation (Criterion 4);
- Appreciation of, and incorporation of, Aboriginal values in forest management planning (Criterion 6); and
- Level of understanding and awareness of forest management planning (Criterion 6).

This list should be seen as a mere starting point for an ongoing discussion.

2.3.2 Collecting existing data

Simply knowing that data exists doesn't mean that it is available in the form required by the Model Forest, and at the necessary temporal and spatial scales. Even when data exists, collecting it is time-consuming, and frequently unearths hidden surprises about the inherent unreliability of the data. Moreover, "owners" of data are often protective of "their" information, and can be reluctant to release it. This is particularly the case when an agency or organization feels that the data may reflect poorly on that organization, or show a negative trend.

2.3.3 Gathering new data

This can be expensive; and cost-saving solutions may or may not provide data with sufficient accuracy to allow for meaningful conclusions to be drawn.

2.3.4 Responsibility for "data stewardship"

In most cases LLI data is being collected from a variety of sources, with the hope that an intelligent collection of data (resulting from a good LLI framework) will produce a whole that is greater than the sum of its parts. But who "owns" this whole, and who will take ongoing responsibility for it? The Model Forest has the holistic vision, but doesn't have either the institutional solidity or data-gathering responsibilities of some of its partners.

Recommendation #5: Establish an appropriate forum to analyze specific challenges related to data gathering, long-term monitoring, interpretation and data stewardship; and to discuss and develop common approaches and solutions.

Possible mechanisms to carry out this recommendation could include any combination of discussion paper, compilations of information from across the Network, Internet discussion groups, and informal discussion time at an appropriate Networking meeting.

2.3.5 Promoting efficiencies in monitoring

Monitoring LLI can turn into a significant expense, with the responsibilities typically borne by a variety of agencies, both public and private. Adequate and credible monitoring of SFM should be considered part of the "cost of doing business," rather than as an "add-on" expense. Nevertheless, it is to everyone's advantage to explore innovative ways to minimize the expense of monitoring LLI while maintaining and improving upon the validity, credibility and comprehensiveness of the overall monitoring program. Two suggestions have been made for how to address this problem; *remote sensing*, and *simpler indicator sets*.

Remote sensing: Several Model Forests have expressed the hope that remote sensing might prove to be a good way to gather several important indicators. Remote sensing offers the promise of being able to monitor landscape-level indicators (such as forest cover) without waiting for forest inventory updates (e.g., FUN), or where the basic inventory does not exist (EON). Remote sensing also offers the potential to monitor stand-level conditions (such as habitat quality or area and type of partial cutting) without doing costly field work.

There are significant questions, however, including the following:

- Is data obtainable by remote sensing necessarily a valid indicator of SFM?
- Can remote sensing provide information on these conditions with sufficient detail, accuracy and credibility to be useful in monitoring and reporting on SFM?

Within the forestry community there are both remote sensing "enthusiasts" and "skeptics." The author of this report is not qualified to evaluate the technical merits of remote sensing research proposals, and can't offer a recommendation one way or another as to the Model Forest Network's role in exploring the use of remote sensing. However, Section 2.6.1 includes a list of conditions that should be met by *any* LLI research project supported by the Model Forest Network. Two additional conditions are specifically relevant to the topic of remote sensing:

- The Model Forest Network's role should likely be as a collaborator, rather than as a principal investigator; and
- The Network should support specific deliverables that relate to *methodology* (such as information on the margin of error, etc); the Model Forests themselves should be responsible for the portion of the project that involves gathering specific *information*.

Reducing the number of indicators: A particular concern has been raised in many quarters; namely, that there is a need for *fewer* but *better*, or *"smarter"* indicators. A "smart" indicator is one that provides rich insight into significant aspects of SFM, rather than just a piece of relevant

information.

Recommendation #8: Develop a "smart set" of between 5 and 15 indicators, common to most or all Model Forests and sufficiently broad in scope to give an approximation across the entire range of CCFM criteria.

Model Forests are particularly well suited to take up this challenge, since the Network includes a broad diversity of ecosystem types, ownership patterns, population bases, partnership makeup, etc. If the Model Forest Network can successfully devise an acceptable "smart set" of about 5-15 indicators that are common across all Model Forests, then there would be a high likelihood that it would be applicable at the local level right across Canada and beyond. Below are a few suggestions for how such an initiative might be carried out:

- Prepare a brief discussion paper that explores ideas for simplified indicator frameworks, including a review of related work in other fields, such as health. The purpose of the paper would be to encourage people involved in LLI to "think outside the box."
- Convene a facilitated workshop with representation from all Model Forests and a few carefully chosen guests who have experience in the subject (but are invited as participants, not as experts). Participants would be tasked with the challenge of devising a first draft smart set of indicators, building on work that has already been done by Model Forests. The recent report on common indicators may prove useful, but the best indicators may not yet be commonly adopted by Model Forests and indeed may very well come from out of left field, inspired by the approaches followed in other sectors.
- Distribute this draft set for peer review. Invite criticism, but challenge commentators to replace any "suspect" indicators with ones that are *better* and *smarter*.
- Assess the results of this peer review and agree on a final set.
- Facilitate efforts across the Model Forest Network to measure and report on this smart set. At this point there may be a need to test the potential of remote sensing as a monitoring tool. In this case there would be a clear buy-in across the Network, and it would be the Model Forest Network as a whole that would be driving the research agenda.
- Publish the results and present them to other groups that are grappling with the challenge of implementing practical, credible indicator monitoring programs..

There is considerable frustration among many forestry companies that are seeking to certify their operations to the CSA SFM standard, much of it related to the expense of monitoring complex indicator sets. As a result, it is reasonable to predict that there will be considerable pressure to modify the CSA's LLI monitoring requirements when the standard goes through its first review process, due to be completed by 2001 at the latest. The Model Forest Network, if it acts now, could potentially offer a viable solution that has been tested for practicality, credibility, validity and

acceptability, and would enhance both the practicality and the consistency of the CSA standard.

At the same time, a "smart set" of indicators, if well chosen, could also potentially be integrated into the monitoring requirements of the Forest Stewardship Council regional standards currently under development in Canada. If the same basic indicator set were to be adopted by both the CSA and the FSC, then the Model Forest Network will have made a huge contribution to SFM by building a bridge of consistency between the two major forest certification systems in use in Canada. This would make it significantly easier for forest companies to meet the monitoring requirements of either standard, or both of them.

The Model Forest Network is in a particularly good situation to carry out this task, since it is not directly affiliated with either the CSA or the FSC and can, if it acts in a transparent and even-handed manner, avoid the polarities that have undermined previous efforts to encourage greater consistency between the two certification standards.

2.4 Use of Indicators in Computer-based Models

Some Model Forests have shown a particular interest in incorporating LLI into Decision Support Systems to carry out adaptive management. There are two stages in this process when LLI can be particularly helpful:

Planning: At the planning stage, indicators challenge forest managers to *forecast* or *predict* how a certain management activity might impact upon a particular indicator. An optional elaboration on this is to outline a *scenario* or a range of scenarios, that allow people to imagine more vividly how a series of management activities might impact upon a range of indicators.

Evaluation: After carrying out a particular activity or group of activities, the indicator is monitored, the results compared against the baseline, and any difference will help to determine whether or not the management activities selected are actually having their desired effect.

Progress made: MCG has developed a series of scenarios that describe landscape conditions according to a variety of different management priorities (timber, wildlife, water protection, etc). Furthermore, they have put together a "workshop package" that allows them to apply their methodology in other forest areas (a process that will be demonstrated at an upcoming Network workshop and actually put into practise at FTH). Other Model Forests (e.g., FUN) are focusing first of all on refining the sophistication of their forecasts and predictions. No Model Forests are sufficiently advanced in their development of LLI that they have yet been able to use them in the evaluation stage of the adaptive management cycle. For most indicators there needs to be at least one full year beyond the baseline (sometimes much more) before one can begin the evaluation process.

Challenges: If LLI are to be used in a classic "closed-system" computer model (with all inputs and

outputs expressed as numerical values) then the indicators used in this model must meet a number of strict conditions:

a) They must be both quantifiable and "forecastable.;"
b) It must be possible to identify specific expectations that people have as to the desired future values for each indicator; and
c) The indicators must be clearly related to management activities.

These are desirable attributes for any indicators, but they are *essential* if the indicators are to be used in a computer model. Unfortunately, many forest values do not easily lend themselves to being described in terms of indicators that are quantifiable, let alone forecastable[4].

An even greater challenge is the need to minimize any ambiguity in the link between an indicator and a management activity. Forest ecosystems are enormously complex, and as soon as one moves beyond indicators that relate to timber supply the level of uncertainty rises rapidly. Age class and species structure can give a crude approximation of wildlife habitat suitability, for example, but attempts to refine this model (by adding information about coarse woody debris, fragmentation, connectivity, etc) often generate more questions than they answer. Forest indicators are notoriously "noisy," meaning that they may be impacted upon by a wide variety of factors. In fact, this "noise" is an inherent property of systems that have complex interrelationships, such as forest ecosystems.

This problem becomes even more challenging when addressing social and economic values, which are affected by factors outside the influence of the forest manager (changing societal expectations, fluctuations in the value of the dollar, etc).

As described by MCG, the builders of these scenario planning models do not presume to be able to model every significant aspect of the future forest. But the scenarios do provide enough detail, in a visual map form, to be able to stimulate constructive and informed discussions about the potential implications of management actions, leading to better and more acceptable decisions. A computer model is not, after all, a decision-*making* system but a decision *support* system. Any scenario produced using such models will always have a significant degree of imprecision about it, but it can nevertheless be extremely useful in helping to focus the attention of resource managers and stakeholders on the link between forest management decisions and the impact of those decisions on forest structure.

2.5 Use of LLI in Other Forest Management Activities

LLI can be used in adaptive management planning without necessarily having to generate forecasts

[4] Some economists propose otherwise, but their results are often of more theoretical interest than practical relevance.

or predictions within the constraints of a computer model. Some possible uses are described below.

2.5.1 Developing thresholds, targets, etc

Once a baseline measurement has been obtained for an indicator, it is possible to identify a minimum threshold, maximum limit, and/or a "target value" for that indicator. Most Model Forests have the intent of doing this, but it is difficult to assess progress until the first baseline measurements have been completed.

2.5.2 Setting objectives, voluntary certification

LLI frameworks can be very helpful in setting management objectives for SFM. By identifying indicators for a broad range of criteria and values, forest managers are also challenged to set strong objectives for those same values. This is particularly relevant in the context of voluntary certification of forest management, since it is precisely this use of indicators that is built into the Canadian Standards Association's SFM standard.

Current status: Some Model Forests are developing management objectives according to an indicator framework (e.g., WNF), while others are deferring to their partners with management responsibility to do this (e.g., LAB, FTH). In reality, the difference between these two approaches may be more semantic than actual. No Model Forests are anticipating seeking certification on their own behalf, although a number have indicated an interest in working with partners who are exploring certification options. Some (e.g., WNF, FTH) have identified as a specific priority the need to take account of the requirements of the CSA Guidance (Z808) and Specifications (Z809) documents.

The Forest Stewardship Council's Principles and Criteria require that monitoring take place, including indicators related to yield, growth rates, flora and fauna, environmental and social impacts, and economic factors. An indicator framework developed according to the CCFM criteria would in all likelihood meet these requirements. In other words, there is no inherent reason why the monitoring requirements under both the CSA and the FSC standards could not be substantially the same.

Challenges: It may be the case that some Model Forests - or some Model Forest partners - anticipate the Model Forest playing a role in certification that it may not be able to deliver on. For example, would a public participation process convened by a Model Forest meet the requirements of the CSA standard? No Model Forests have copied the industry approach and hired a consultant to do a dry run audit, but they may have to make significant changes before they'd be in conformity with the requirements of Z809. It may also not be appropriate for Model Forests to play such an active role in voluntary certification. Model Forests can, however, provide valuable assistance by taking a lead on implementing a methodology that is appropriate to that particular region, and by developing a locally relevant suite of indicators that can then be adopted and applied by the certification applicant (as in the approach followed by FUN).

2.5.3 Assessing the impact of management activities, standards or best management practises
LLI can be used to test the effectiveness of management activities, standards or best management practises. Indicators can tell you if the things you're doing are actually achieving your goals and objectives. Many Model Forests have identified this as an important priority, but it it too early to report on achievements, since there must be at least two consecutive measurement points with an interval in between[5].

2.6 Broader Applications of LLI

2.6.1 Guiding further research

One of the criticisms made during the evaluation of the Model Forest Program at the end of Phase I was that there was an overemphasis on research at the expense of on-the-ground application. At the beginning of Phase II some Model Forests adapted their work plans so that proposals would be assessed according to their "relevance" to the CCFM criteria. This did not prove especially helpful in the early stages of Phase II, since the criteria are so broad that almost any proposal could be "justified" in this way. Researchers (whether biologists or sociologists) *always* want to learn more about their subject, and are generally happy to promise "useful indicators" in exchange for financial assistance.

Progress made: This is starting to change, both within the Model Forest Network and in individual Model Forests, and the development of LLI frameworks is crucial in this respect. The process of developing and applying LLI has pointed to the need for further research in particular areas. Gaps arise at every stage in the process, as indicators are identified, measured and interpreted. Having encountered these gaps, Model Forests are now in a much better position to ask specific questions for researchers to answer, and are thereby better able to direct research to areas where it is most needed by forest managers.

Still to be done: The shift described above needs to be continued, fostered, transferred to Model Forests that are still "swimming," and promoted more widely. In particular, ways need to be found to strengthen the relationship between the Model Forest Network and the CFS Science Network, as well as other research agencies. On collaborative projects, the Model Forest Network should pose the specific questions to be addressed, while the research would be carried out under the auspices of the Science Network. The Science Network can better ensure the quality of the research, while the Model Forests can help to ensure that there is immediate applicability of results.

In any case, any research project undertaken as a Model Forest Network strategic LLI initiative should meet the following criteria:

[5] Historical trends can be reconstructed without having to go through two measurement periods. These trends can be an effective way to report on the overall state of the forest, but are less useful in evaluating current management activities.

1) The questions should be very specific and practically oriented;
2) The research should relate directly to the use of LLI (rather than to larger questions about understanding aspects of SFM);
3) The research should address the common needs of several Model Forests;
4) The research should produce specific results that are transferable; and
5) The research proposal should be submitted to an independent review process to ensure that the methodology is sound, and that the project does not unnecessarily duplicate other research initiatives.

2.6.2 Assessing the overall state of Sustainable Forest Management

LLI are of obvious relevance in assessing the overall state of SFM. A good set of indicators, with up-to-date data as well as trend lines going back in time, can be tremendously informative to resource managers, decision-makers and interested citizens.

Progress made: EON will shortly produce a "State of the Forest Report" developed according to a framework of indicators, and WNF plans to issue a report of its own within the coming months. Both are based on compilations of existing data, and are intended for a general audience. Other Model Forests have identified this as a priority, but have not yet determined whether such assessments should be produced for a public audience, or primarily for use by its partners.

Issues related to credibility: Both of the forthcoming reports referred to above will be based largely on existing data. Will this information be sufficient to give a credible overview of the state of SFM in that particular Model Forest? Credible to whom? It is likely the case that questions of this sort will lead to the identification of gaps in those Model Forest's LLI frameworks.

Issues related to interpretation: There has been very little attention paid to the question of how the collective data sets will be interpreted, by whom, and using what criteria. SFM is a complex, multidimensional subject, and evaluating conflicting data and trends is fraught with hazards. Some maintain that it is possible to compare and weigh all the different data trends to produce something like a "sustainability index." In all likelihood, however, such an exercise would be of limited practical relevance in the messy world of forest management. This is because any "roll-up" has to compare indicators relating to a wide range of ecological, social and economic values. This comparison of "apples to oranges" can only be done on the basis of some common factor, such as dollars, or an even more abstract mathematical index. The more abstract such an index becomes, the less acceptable it is likely to be to people outside of a technical elite, and the less influence it will therefore have in the decision-making process.

It has often been stated that Criteria and Indicator frameworks will demonstrate progress towards implementing SFM (CCFM, 1995). Obviously, an industrial forest manager hopes that this will be the case. But Model Forest partnerships are diverse, and some partners may feel that the opposite is the case; that the data supports an opposite conclusion. As well, people are quite cynical, and more sophisticated than they are often given credit for being. They tend to respond negatively if they

perceive that they are being (in the words of one interviewee) "fed a 'line' to justify cutting trees."

On the opposite end of the spectrum, WWF International recently published a report that elegantly lays out information on a number of global indicators related to sustainable development, and their bleak interpretation of the data is made abundantly clear already in the title: "*Living Planet Report: Overconsumption is driving the rapid decline of the world's natural environments*" (WWF 1998). Such unambiguous interpretations demonstrate the powerful use to which indicators can be put, but Model Forests do not serve their partnerships well if they use LLI to make sweeping generalizations, either positive or negative. (Recommendation #5, in Section 2.3, identifies the need to explore this issue further.)

2.6.3 Assess the impact of the Model Forest on SFM

Each Model Forest has prepared a mid-term evaluation framework, which will assess its performance against the key Objectives of the Model Forest Program, including one relating to the establishment of "acceptable indicators, measurement and monitoring systems and reporting systems *that can measure performance relative to the model forest's goals and objectives*" (emphasis added). Each Model Forest has identified key activities, outputs and clients, as well as predicted outcomes and impacts, according to a standard "results-based management" framework.

Comment: There is some ambiguity in how the above objective is to be interpreted. In particular, whose performance is being measured? An indicator set developed according to the CCFM framework (such as the LLIs discussed in this report) is intended to monitor the performance *of the management agencies that are carrying out activities in the forest* (as well as monitoring overall societal trends). The evaluation framework, on the other hand, is designed primarily to measure the performance *of the Model Forest*. These are different performance evaluations, requiring their own distinct indicator sets. There is a tendency in the Model Forest Network Secretariat to conflate these two concepts[6], and confusion will be the likely result.

2.6.4 Apply LLI outside of the Model Forest area

Perhaps the best measure of the success of the Model Forests will be their ability to have an influence that goes beyond their own area.

Progress made: Most Model Forests have identified a need to promote the methodologies developed by Model Forests for developing, refining, and measuring LLI, and for using them in a variety of ways towards implementing and promoting SFM. Some of the ways that this is already

[6] At the International Model Forest Network meeting in Wemme, Oregon, in March-April 1998, for instance, the theme of "Indicators of Progress to Sustainable Forest Management" was introduced with four presentations dealing specifically with the development of indicator frameworks along the lines of those reviewed in this report. The workshop discussion, however, was led by a facilitator that had been primed to guide discussions towards the identification of "Indicators of Success at the Model Forest/International Model Forest Level," which relates more to the performance evaluation framework than to LLI as such.

happening include the following:

- Several Model Forests (e.g., FUN) have had commitments from their partners to apply LLI work on forest holdings that lie outside the Model Forest area.
- Several (e.g., PA, FTH, WNF) have had specific commitments from their respective provincial governments to take the LLI methodology developed by the Model Forests, and to apply it across the province.
- FUN is in the unique position of having an "Adjunct Model Forest," and the Nova Forest Alliance is in the process of reviewing Fundy's indicator development methodology and adopting it in their own area as a way to engage their partners.
- MCG has packaged its "scenario planning" approach and methodology in a workshop format that can be presented to any multistakeholder group interested in using it.
- In September 1997 MCG hosted a joint Model Forest/CIF conference on the theme of "Criteria and Indicators and Certification of Sustainable Forest Management," which provided the opportunity for an intermingling and networking among Model Forests focused on LLI work and others looking at C&I in the national and international contexts.

This list is an impressive start, but it only hints at the potential for further dissemination of the Model Forests' methodology and achievements. Section 2.7 below outlines a recommendation that would significantly enhance this objective. In the mean time, careful attention should be paid to how best to document the influence that Model Forests are having. If other agencies are adopting and using LLI, is this because of direct Model Forest influence, or is it more a case of a parallel interest?

Recommendation #10: Closely track the influence that Model Forest LLI activities are having outside of the Model Forest area.

This influence may come in a variety of forms - the adoption of LLI sets or specific indicators, the sharing of data, the transfer of LLI methodologies. Wherever possible, it should be documented by memos, citations and other details of this sort.

2.6.5 Linking the Model Forest's LLI work to major related policy initiatives

There are a number of initiatives involving measuring and reporting on indicators of SFM, including ones relating to:

- international reporting on C&I
- national reporting
- provincial "roll-ups" into the national reporting process
- other provincial reporting processes
- provincial requirements for monitoring and environmental auditing

- voluntary certification at the FMU level

Model Forests should, if they are to function as true centres of excellence for transferring on-the-ground solutions to the challenges faced by SFM, be able to support and enhance all of these initiatives.

Recommendation #11: Commission a discussion paper that identifies all major SFM indicator initiatives in Canada and explores opportunities to:
a) improve indicator reporting through the sharing of valid LLI frameworks;
b) harmonize methodologies and protocols;
c) encourage consistency or convergence where appropriate; and
d) minimize duplication wherever possible.

The purpose of the paper would be to stimulate interest on the part of key parties outside of the Model Forest Network, engaging them in an exploratory dialogue. The result would hopefully be to stimulate interest in and commitment to the establishment of ongoing strategic linkages.

Recommendation #12: Forge strategic linkages with organizations in Canada that are involved in C&I or LLI, including the Canadian Council of Forest Ministers, the Canadian Standards Association and the Forest Stewardship Council.

There is a need to explore linkages and collaborations between LLI initiatives and provincial/national reporting requirements on C&I. An intended outcome of such discussions would be an expanded commitment to using lessons learned by the Model Forests in carrying out LLI work, and to transfer that knowledge to the provincial and national levels, where appropriate. At the same time, there would be an opportunity to explore opportunities for collaboration, harmonization and synchronization among and between various C&I-related initiatives. Recommendation #13 (Section 3.2.1) suggests a specific mechanism to foster such linkages.

2.7 Communication and Outreach

Progress made: It was not possible to assess the level and quality of internal communications taking place within Model Forests pertaining to LLI, since much of this is ephemeral and very difficult to reconstruct after the fact. The "Status Reports" provided in Appendix A include mention of reports and publications that relate directly to the use of LLI. As well, the workshop being planned by MCG is an important component of its efforts in communications and outreach.

Comment: In general, much of the material that has been prepared with respect to LLI consists of either "progress reports" or technical reports, intended primarily for internal use. These can sometimes be helpful to other Model Forests. A good example of a useful progress report is FUN's 1997 report on its "Local Level Indicator Development Process," which was valuable when it was issued because so many Model Forests were not as far along the path at that time. A recent report by LB outlines a proposed monitoring protocol that other Model Forests might benefit from. However, relatively few reports have been prepared with a general audience specifically in mind, and so the overall impact of these reports is limited. The most notable exception is the series of newspaper articles prepared by LAB, which WNF and EON have also used with only minor modifications.

Recommendation #9: Develop and publish, at the National level, a "how-to" guide to using LLI, incorporating as "case studies" the strongest elements from all Model Forests across the Network, explaining and demonstrating diverse approaches to identifying indicators, evaluating them, gathering data and applying indicators in forest management planning and reporting.

Such a report should not try to outline a "single" or "ideal" methodology to developing LLI, nor should it confuse people with an overwhelming variety of diverse information. The report should provide a carefully chosen compilation of the highlights across the Network, focusing on each Model Forest's particular strengths. The report should be targeted at a non-specialist but active reader (such as someone who would engage in a public participation process on forest management). The general guide should be accompanied by a supplementary "facilitator's guide" and "manager's guide" that would go into more depth on detailed subjects related to public participation and data gathering.

An essential element of any strategic approach to LLI *must* be the effective dissemination, communication and transfer of the knowledge and results obtained. If Model Forests *only* succeed in implementing SFM on Model Forest sites, the Model Forest Program will end as an abject failure; since it would, in effect, have demonstrated that the implementation of SFM in Canada as a whole is prohibitively expensive without ongoing public subsidies. This is not the kind of message that Canada wants to be sending to its trading partners. Thankfully, the examples provided in Section 2.6.4 already show that Model Forests are having a positive impact on LLI development across the country; but this needs to be encouraged and promoted.

2.8 General Observations

2.8.1 Progress made

Appendix A lists the key achievements for each Model Forest, based on the information they provided in the course of this research. There were also a number of more general comments, however, and some of them are important to note, since they are in all probability relevant to most

if not all Model Forests.

Incorporating work from Phase I: Although the introduction of objectives relating to indicators was for some Model Forests a new element of their plans for Phase II, several Model Forests (e.g., BSL, MCG, WNF) described how they incorporated the work that had already been done in Phase 1, and folded it into the work plan related to LLI.

Common Goals: Partners are now working with a common, widely accepted set of clearly stated goals. This helps to focus and direct the work on LLI (e.g., FTH, LAB, BSL).

Better understanding: After much initial confusion, partners now have a better understanding of LLI and how it fits into their own work.

2.8.2 Current challenges

Getting people to work interdisciplinarily: This is an enormous challenge. Working in a participatory way on LLI is in many respects more challenging than other participatory processes. As will all multistakeholder processes, a successful LLI process must include people with different interests, values and viewpoints (e.g., conservation and timber interests). An equal or sometimes even greater challenge is to include people from various disciplines (covering each of the three legs of the sustainability tripod - ecology, society and economics). They must not only be included, but must be made to *feel* included. Lastly, an LLI process must take account of the interests of people with widely different world views. The researcher is continually seeking to answer questions in order to pose still more questions, while the manager grows impatient and wants to simply "get on with it." Space must be found for all different viewpoints. It is perhaps better not to view this cluster of challenges as something that can be solved with a particular "method," but rather as a "creative tension" that participants should be encouraged to learn to respect and even enjoy, on the principle that the whole is greater than the sum of the parts.

Not all Model Forests yet have a clear "champion" for their LLI work. This point was made by one CFS Regional Coordinator, and while it is difficult to conclusively confirm or disprove this statement, there is a possible "indicator," namely, how Model Forests have filled in the "outcomes" section on the LLI section of their mid-term evaluation frameworks. Some of the outcomes are very vague, or simply a restatement of the CCFM criteria. This suggests a possible lack of general appreciation of *why* Model Forests are involved with LLI[7]

There is still not enough commitment and buy-in from people and agencies that are not part of the "inner circle." This point (or a variation) was mentioned by several Model Forests, but it is

[7] Alternatively, it may signify nothing more than frustration or disinterest over yet another bureaucratic exercise foisted upon the Model Forest from above. As always, it is dangerous to interpret indicators too hastily!

quite possibly a more serious issue for those Model Forests that *don't* recognize it as an issue.

Build the capacity of partners to participate effectively and/or establish partnerships with new agencies: It will always be important to bring new people on board, but it takes dedicated effort, time and resources to bring them up to speed when a core group of people is already comfortable with the concepts. The "How-To" guide proposed in Recommendation 9 (section 2.7) will help in this regard.

3.0 ASSESSMENT OF LLI STRATEGIC NETWORK INITIATIVES

3.1 Introduction

In Phase II of the Model Forest Program special funds were identified that were to be used to deal with strategic issues of major importance. One of the first such initiatives to be so identified (along with Communications and Enhanced Aboriginal Involvement) was work on Local Level Indicators. This report is being carried out in the context of a review of the Model Forest Network's strategic networking initiative related to LLI.

It may be helpful to start any assessment of Network activity by defining more clearly what is meant by a "strategic network initiative." The answers to the three questions below are derived from interviews with the Director of the Model Forest Program and the Chair of the Local Level Indicators Working Group (LLIWG), and are kept in point form to avoid over-interpreting.

3.1.1 Why is the development of LLI *strategic* for the Network?

- Indicators are a key element of SFM.
- There has not been enough attention paid to indicators at the forest management unit level.
- Model Forests have a key leadership role to play, and this is the right time for Model Forests to demonstrate leadership with respect to LLI.
- Indicators of SFM are being applied at local, provincial, national and international levels; it is important for Model Forests to be aware of the broader relevance of their work.
- Model Forests risk being marginalized if they are not at the forefront.

3.1.2 What are the characteristics of a strategic network initiative related to LLI?

- Better capitalization of knowledge and experience
- Increased effectiveness
- Economies of effort
- Build synergy
- Sharing
- Helps to accelerate the process
- Enhances the quality of achievements
- Networking should strengthen Model Forests, not subsume them

3.1.3 How might the effectiveness of strategic network initiatives be measured?

- The measurability, repeatability, acceptability and credibility of the LLI frameworks that are developed by Model Forests
- The ability of the Model Forest Program as well as individual Model Forests to share good information and useful knowledge
- The transferability of knowledge and experience gained outside the Model Forest area

3.2 Review of Activities of the LLIWG

3.2.1 Overview

As of February 1999, the following are the "products" of the LLIWG:

(A) Meetings/Workshops

Table 3: Schedule of Meetings and Workshops of the LLIWG

Chaffey's Locks	July 1997	Founding meeting of the LLIWG
Prince George	September 1997	Workshop on socio-economic indicators
Rimouski	November 1997	Planning meeting of the LLIWG
Toronto	January 1998	Meeting between members of LLIWG and Socio-Economic Research Network
Toronto	April 1998	Planning meeting of the LLIWG
Calgary	August 1998	Workshop on remote sensing
Gananoque	October 1998	Workshop on biodiversity indicators

(B) "Expert" visits/"Twinnings"

One of the outcomes of the Rimouski meeting was a commitment to facilitate small-scale networking between pairs of "like-minded" Model Forests, through visits and meetings to support knowledge transfer. As well, funding was provided to support a number of visits by experts. It has not been possible to reconstruct a comprehensive list of the activities that took place under this initiative, but some of them are listed below:

- Louis Lapierre (FUN) visit to BSL
- Rick Blackwood FTH visit to MCG
- Martin von Mirbach (WNF) facilitation at PA, MB, EON
- Tom Beckley (Socio-Economic Research Network) visit to WNF, BSL
- EON visit to FTH, MCG

(C) Products and Reports

- A binder, comprising an extensive summary of literature on socio-economic indicators, was distributed to all Model Forests and participants at the Prince George workshop in 1997
- A draft Glossary of terms related to C&I was prepared (summer 1998)
- A draft report on LLI being used in common within the Model Forest Network (November 1998)
- A "Gap Analysis," assessing LLI work across the Model Forest Network (March 1999)

Other reports are expected to be forthcoming from projects currently underway.

3.2.2 Current status of the priority strategic activities identified at the outset of the LLIWG

At its founding meeting (the "Opinicon" meeting, at Chaffey's Locks), the LLIWG developed a comprehensive list of strategic priorities. They are listed in Table 4 below, in order of the priority given to them at that workshop. Along with each activity is a brief comment assessing its current status.

Table 4: Current Status of Strategic Activities Identified at Opinicon Workshop, July 1997

Strategic Activities	Current Status
1. Develop a mechanism for the review of local level indicators and the results of their application. To scope out a consistent documentation or protocol for indicators including measurement protocol, measurement frequency for the purpose of operationalizing development and implementation of indicators	This is actually a whole host of activities, with the current status as follows: review indicators (started in Holmes Report), review results (not done at Network Level); scope out protocol (getting started)
2. Use the Internet Discussion Group regularly to debate structures (summaries posted monthly) and activities to deliver on our mandate - analyze what others are doing - as required form small sub-work groups based on specific needs	Not done
3. Develop a prioritized list of common indicators as well as indicators of common concern	Done, but not priorized
4. Document and share the individual experiences of Model Forests in developing and using local level indicators	Ongoing
5. To facilitate and encourage model forests to report on the results of trials of application of indicators in a management system on an ongoing basis	Ongoing
6. Indicator Workshop on Socio-Economic September 25-26 in Prince George	Done

7. Develop a contract list of external agencies working on local level indicators	Not done
8. Develop a comprehensive list of agencies that describes relevant data to assist in the LLIWG activities	Not done
9. Actively seek out scientists to (post names on the Internet) assist in addressing indicators of common concern across the network on an ongoing basis (scoping only not Implementation).	Not done (although some contact made with the Socio-economic Research Network)
10. Identify and assign contact people within the LLIWG to act as a conduit to external agencies involved in C&I for data assimilation, acquisition, knowledge transfer, communications, etc.	Not done
11. Update and maintenance of the "Compendium of Information on Criteria & Indicators - Canadian Model Forest Network Local Level Indicators Working Group - June 1997	Done, but not updated
12. Encourage the development of a network of demonstration sites across model forests	Not done at a Network level
13. Develop a comprehensive Glossary of Terms for Criteria & Indicators to ensure that the members of the LLIWG are using similar language	Draft completed, final version not yet distributed
14. Give support to the concept of a workshop on traditional ecological knowledge	Not done, but research is being carried out into TEK indicators
15. Develop appropriate messages for the Model Forest Communications Network Committee	Not done
16. Contribute to the list of potential national level indicators developed by Fundy Model Forest	Not done
17.To prepare a statement of principle for the LLIWG which encourages and develops creative problem solving in our activities.	Not done
18. Prioritize external agencies regarding communications, data exchange, knowledge transfer (EG: (i) Canadian Council of Forest Ministers (CCFM) C&I Secretariat and (ii) Provincial Governments)	Not done
19. Impart to the Model Forest Network Communications Committee the LLIWG Terms of Reference and Activities and ensure the appropriate messages are captured in their communications	Done
20. Brief the Aboriginal Model Forest as a member of the LLIWG	Done
21. Announce the LLIWG Mandate, Terms of Reference in the Model Forest News	Done
22. Hold a symposium towards the end of Phase II at a time prior to the program evaluation	Was planned from the outset to take place some time in 2000
23. Schedule and hold LLIWG meetings	Done

24. Communicate with the National Strategic Committee on the activities of the LLIWG - submit Strategic Workplans, Annual Workplans, and Annual Report, as necessary, for consideration and approval	Done
25. Prepare an Annual Report for the LLIWG	Not done; first Annual Report to be prepared shortly
26. Prepare an Annual Workplan for the LLIWG	Done
27. Prepare a Five Year Action Plan for the LLIWG	Not done

It is clear from the above table that the initial meeting of the LLIWG set an ambitious agenda for the Model Forest Network's strategic work on LLI. The most significant achievements have revolved around helping Model Forests to identify suitable indicators. That work is now largely done, and with the exception of the current work on socio-economic indicators and indicators relating to traditional ecological knowledge, there may not be much left to do, with the possible exception of identifying indicators related to public participation, understanding and commitment.

3.2.3 Assessment of activities taking place in 1997-98

The meeting in Rimouski in November 1997 brought about a change in focus. Action items that arose from that meeting were more concerned with short-term projects that would have an immediate and practical benefit to Model Forests struggling with LLI. Some participants were still finding it hard to engage their partnerships in meaningful activity related to LLI, and were seeking ways to get the ball rolling as quickly as possible. The solution was to initiate a series of "twinning" visits. In interviews for this gap analysis, many General Managers spoke highly of the benefits of the twinning approach.[8] The benefits of twinning are obvious, since they allow Model Forests to seek out information and advice on an intensive, as-needed basis, and in this respect are an excellent and highly efficient vehicle for knowledge transfer. As well, the process of knowledge transfer has been very much a two-way flow. People brought in as "experts" in fact learned a great deal by becoming more familiar with other Model Forests, and brought benefits back home with them. On the other hand, twinning projects are of immediate benefit primarily to the Model Forests directly involved, and there are not always tangible results that are apparent to the Network as a whole. It may well be that there is a decreasing need for such activities, once all Model Forest partnerships are comfortably up to speed.

A survey that was carried out in early 1998 by the LLIWG is perhaps indicative of the level of confusion that still existed across the Model Forest Network at that time. Model Forests were asked to identify their key issues and areas of interest, and the results were tabulated and distributed prior to the development of the 1998-99 work plan. Of the 70 different items listed, 10 are recorded as receiving no votes, 35 received one vote, 21 received two votes and 4 received three votes. These

[8] The author of this report took part in three of those "twinning" projects, as a facilitator and (in one case) as a report writer.

results are so scattered as to be almost random. There is considerable confusion in how the items are organized, with many items listed under headings that are not relevant to that item ("how to define SFM" under "monitoring," etc). As well, the list is a jumble of items that are activities ("developing common terminology"), objectives ("respect of annual allowable cut in small private forests") and outcomes ("changing people's mentality and consciousness").

3.2.4 Current status of 1998-99 Work Plan

Table 5: Status of Current Work Plan

Recommended Project	Lead	Current status
Testing remote sensing technologies for monitoring landscape scale indicators	FUN	Workshop was held in Calgary, August 1998
Understanding the interdependence between social, economic and ecological indicators; and Development of social and economic indicators across the Model Forest Network (measuring changing social values)	FTH, FUN	Project is getting underway, under the leadership of the Socio-Economic Research Network; expected to carry on for one year
Identification of LLI that are common across Model Forests and may be addressed by national level databases	EON	Draft report completed (November 1998), dealing with common indicators rather than with national databases
Development and application of scenario planning methodologies as a component of the development of SFM plans	MCG, FUN	Workshop has not yet been scheduled
Identification and description of models applicable to C&I	MCG	An overview report is expected shortly
Development and maintenance of a network repository of C&I related information (LLI web site)	LAB	The capability of having an LLI web site has been enabled, but has not been implemented
Incorporation of Naturalized Knowledge in the development of indicators	PA	Project getting started
Examine and adapt existing monitoring protocols	MCG	Initial overview report to be completed 03/99; following review final results are expected in 06/99
Development of Network Level C&I presentation materials for various audience	WNF	Project is getting started
Workshop on identification and measurement of biodiversity indicators; How to incorporate biodiversity into management planning	MB, FUN	Workshop held in Gananoque, 10/ 98
Guidelines on how to apply criteria and indicators	FUN	Workshop planned for FY 99/00

Given the confusion that was evident in the survey it's a credit to the LLIWG that it was able to develop such a coherent workplan. With several of the workplan items still incomplete it's hard to assess the overall impact of the LLIWG, but the fact that so many of them*are* still in the "just getting started" stage with only one month left in the fiscal year is not an encouraging sign.

3.2.5 Summary

Over the life of the LLIWG there has been much learning and sharing on the part of LLIWG members, and this has helped to increase the level of understanding and commitment in individual Model Forests. In particular, many interviewees said that the meetings were very valuable in raising their level of understanding. Some qualified their praise by suggesting that the workshops would have been improved had they been less focused on "show and tell," and more on discussion. Several people felt, however, that there may be little reason to continue to convene regular meetings, now that the LLI work in each Model Forest is well underway.

Aside from meetings and visits, the LLIWG has produced very little in the way of actual deliverables, and what has been produced was not always as helpful as anticipated. To be specific:

- There are proceedings or minutes from most of the meetings, but these are not especially helpful to people who did not attend those meetings.
- A large binder of collected papers and articles was prepared in advance of the meeting on socio-economic indicators in Prince George. Several interviewees said that they had found it useful, others were aware that it existed, and one did not know what I was referring to but felt "sure that it was in the office somewhere." The lessons that one might draw from this is that research papers and articles have a remarkably short "shelf life," and that internal communications within Model Forests could be improved upon.
- Several Model Forests have made use of the draft set of definitions that was developed. Some, however, were sticking to the CSA definitions of key terms in order to ensure conformity with the CSA standard. At least one General Manager could not recall receiving the glossary, and others wondered what had become of the final version, incorporating suggested additions and modifications.
- General Managers were aware of and generally appreciative of the study that had been done on identifying common indicators. One interviewee expressed disappointment that the report did not address the subject of national level databases, which was part of the initial action item. This could be the result of developing a workplan by committee, when several similar-sounding objectives are cobbled together into a single project when they should have been kept as separate items.

Almost all people interviewed for this report expressed dissatisfaction with what they perceived as a relative lack of accomplishments of the LLIWG. However, it may be worth asking, "relative to what?" Relative to what LLIWG members hoped to achieve? Perhaps they had unrealistic or unreasonable expectations. Relative to what could have been accomplished had there not been consistent tensions within the group, and between the group and CFS? This question is touched on

in the following section.

3.3 Review of the Structure and Operations of the Model Forest Network's Strategic Approach to Local Level Indicators

Many concerns were raised about the structure and functioning of the LLIWG, most of which are included in the three main areas discussed below.

3.3.1 Work plan development

One interviewee put it most bluntly when stating that LLIWG members "had their eyes sharply focused on the LLIWG as an extra funding source to support their own Model Forest project priorities." Some may feel that this is an unfairly harsh assessment, but few would deny its relevance. The Working Group *can* and *has* been able to support and promote strategic networking, but not in a sustained manner. From my interviews with LLIWG members I am convinced that everyone recognizes the problem and genuinely strives to overcome it. This report suggests that the fundamental factor inhibiting a more effective working group is a systemic flaw in the makeup of the LLIWG: *each working group member is accountable primarily to his/her own Model Forest, rather than to the group as a whole*. With each Model Forest represented on the working group, there is no strong inducement to be accountable to a broader constituency. The group can and does work in a spirit of genuine collaboration, but this may be driven more by enlightened self-interest than by genuine *strategic thinking* on the part of the group as a whole. Valuable strategic network initiatives do get proposed, approved and implemented in this way, but they may come about more by happy accident than by design.

Recommendation #13: Replace the LLIWG with a Joint Advisory Committee on Local Level Indicators, responsible for providing overall guidance on strategic initiatives related to LLI. Membership would consist of:

- **three General Managers or Model Forest LLI experts;**
- **one Model Forest President;**
- **two representatives (national and regional) from the Model Forest Secretariat;**
- **one representative from the Canadian Standards Association's SFM Technical Committee;**
- **one representative from the Forest Stewardship Council Canada;**
- **one representative from the national C&I Coordinating Committee; and**
- **one representative appointed by the upcoming Chair of the CCFM.**

The above recommendation, if implemented, will help to encourage committee members to focus on the "big picture," and to establish appropriate mechanisms to maintain effective two-way communications for relaying information and receiving guidance. General Managers who are not

on the committee will *require* Committee members to communicate effectively with them and to receive advice and guidance; so that Committee members will be more likely to be focused on the strategic needs of the Network as a whole.

Inviting representatives from outside the Model Forest has several significant benefits. They will provide a "reality check" to ensure that the Model Forest Network is both useful to and accountable to the larger SFM community. The Joint Committee on LLI provides a valuable opportunity to form ongoing strategic linkages with some of the key players that are using indicators of SFM, and where there could be tremendous opportunities for collaboration, knowledge transfer and strategic alignment.

The membership makeup suggested above is intended primarily as a useful example, but it is important that representatives be identified with due consideration to ensure appropriate diversity of regions and sectors represented, and including people that bring the best aspects of both the "science-based" and "community-based" approaches to LLI.

3.3.2 Work plan approval

CFS established a strategic funding source at the beginning of Phase II because it learned during Phase I that it can be hard for Model Forests to pool resources, since this requires decisions from each partnership, an unbearably awkward process. Establishing a separate source of strategic funding was intended to increase the flexibility with which the Network could respond to strategic opportunities in a timely and genuinely "strategic" fashion. Unfortunately, it seems as though this has not happened. The current process is, by most accounts, unreasonably cumbersome. The work plan requires review and approval by three bodies (LLIWG, NOC, NSC), and members of each body have an opportunity to take their "kick at the cat."

A related issue is that, from the perspective of someone outside the Model Forest, the process by which proposals are reviewed and assessed is opaque, laborious and frustrating, with an ever-changing set of criteria for deciding on project approvals.

The need for each level of Network Committee to "buy into" the work plan is unnecessary and can be counterproductive. When so many people and bodies have ostensibly "agreed" to each project, the accountability for the success or failure of the project is so dispersed as to disappear entirely. If a project fails to deliver, there are any number of people to blame.

There is an important lesson to be learned in any organization that seeks to embrace the concept of "open, transparent and accountable" decision-making: *beyond a certain point, openness dilutes accountability.* The longer a decision-making process is kept "open," the more often it happens that decisions end up getting made by default. These are not necessarily the best decisions; nor is it a genuinely participatory process; nor is there any real accountability for decisions taken in this way. What is needed, in other words, is greater clarity (or transparency) about *who* makes decisions, *when*, on *whose* behalf, and in consideration of input from *whom*.

Recommendation #14: Prepare an LLI Strategy and Implementation Plan.

An LLI Strategy need not be elaborate, but should simply describe the Model Forest Network's strategic interest in LLI, clearly define the Network's desired outcomes, and provide a broad outline of how the Network will achieve these outcomes. It should be reviewed and approved by the NSC. After that, the responsibility for developing and carrying out specific projects can be delegated, with the proviso that the NSC receive regular reports. The NSC should focus on giving good strategic advice, rather than on reviewing operational plans. If the NSC observes a disparity between the actions being carried out and the strategy agreed to, then the NSC can request mid-course corrections.

3.3.3 Project management

LLIWG members are often too busy with other things to provide effective leadership on projects under their responsibility. General Managers are preoccupied with keeping their partners happy, and partner representatives come back from Model Forest meetings to find their "in" baskets piled high with incoming work. This means that projects don't always get the attention and guidance that is required for successful networking projects, and projects that are designed with the best collaborative intentions don't necessarily get implemented in a genuinely collaborative spirit or manner. This is not likely to change unless there is someone dedicated to the task of working on behalf of all Model Forests and the Network as a whole, and who is genuinely accountable to them.

Recommendation #15: Establish a Networking Coordinator, whose duties would include liaising on an ongoing basis with all Model Forests, managing or coordinating projects carried out as LLI Strategic Network Initiatives, and acting as a Secretariat to the Joint Advisory Committee on LLI.

The coordination services proposed here could be handled in a number of ways. They could be based out of Model Forest Secretariat offices either in Ottawa or in a region, or could conceivably be contracted out to a Model Forest. As well, the responsibilities could be kept minimal, or could be expanded to include any of the following:

- "problem solving" in individual Model Forests;
- initiating and guiding knowledge transfer and small-scale collaborations between like-minded Model Forests; and
- implementing specific projects, including some of the activities recommended in this report.

In some cases it makes sense to assign project coordination to a particular Model Forest, and in these situations the relevant General Manager should continue to act as project manager. Organizing

meetings, for instance, may best be handled by the host Model Forest. However, Network projects should in general be assigned to individual Model Forests only when there is a clear reason to do so, and a process in place to ensure that the project adequately reflects the needs and interests of the Network as a whole.

3.3.4 Summary

The series of recommendations offered here imply a shift in emphasis, away from a participatory decision-making mode towards one that is perhaps seen as more hierarchical. These suggestions may seem antithetical to the Model Forest concept, which is predicated on partnership relationships that are open and participatory. But "strategy" is derived from the Greek word for "generalship;" in other words, it's an inherently hierarchical concept. Strategic thinking is not necessarily the strong suit of an open decision-making process. If the Model Forest Network genuinely wants to act *strategically* as a *network*, then it must designs systems that will allow it to do so. At the same time, it is vitally important that there be "buy-in" from across the Model Forest Network, and great care must be taken to ensure that individual Model Forests are strengthened rather than subsumed by Model Forest Network activities. The best way to do this is to build processes that are genuinely participatory at the front end, have a clear decision point, and are truly accountable thereafter.

4.0 CONCLUSIONS

The Strategic Initiative on Local Level Indicators has provided significant benefits both to Model Forests and to the Model Forest Program. Taken as a whole, the strategic initiatives have encouraged people to learn to work together, and has helped to focus the attention of Model Forests on activities that have a measurable positive impact on SFM. This "inward-looking" stage may soon be drawing to a close, however, and simply continuing the Network's LLI work in more or less its current form is not a particularly attractive option.

This Gap Analysis was undertaken in order to help refocus and re-evaluate the needs of the Model Forest Network with respect to its Strategic Initiative on Local Level Indicators. The project is being carried out in a situation in which some participants question the ongoing need for strategic initiatives in this area. Model Forests have been on a steep learning curve over the past eighteen months, but now they should for the most part feel confident enough to simply get on with the task. One respondent put it most succinctly, saying that he did "not, at this time, see any further need for network level discussions." Taken to an extreme, this comment might be interpreted as a recommendation that the LLI strategic initiative be wound down, with the funds used to support other strategic initiatives. However, this would foreclose on the major strategic opportunities that are outlined in this report. Moreover, the structural flaws in how LLI strategic initiatives have been identified, approved and managed may very well simply be replicated in other initiatives.

This report *does* recommend that there be ongoing activities - both meetings and projects - related to LLI. But it suggests a significant refocusing of the priorities for Network activities related to LLI, veering away from the immediate needs of individual Model Forests, and anticipating what will be required to support the vision of Model Forests as recognized centres of excellence in their regions, demonstrating leadership in their own distinctive ways.

Recommendation #1: Provide the LLI Strategic Initiative with a renewed mandate and a more forward-looking focus, with the following specific goals:

a) facilitate knowledge transfer across the Model Forest Network;
b) foster leadership, excellence and continual improvement;
c) promote the broader dissemination and application of LLI work being done by Model Forests; and
d) forge strategic linkages with other relevant initiatives.

This overarching recommendation is best supported through a committee and secretariat structure that incorporates the best aspects of participatory decision-making, and is at the same time accountable and effective.

APPENDIX A:

LOCAL LEVEL INDICATORS STATUS REPORTS

Western Newfoundland Model Forest

High-Priority Objectives

- *Develop and assess LLI*
- *Collect data for LLI*
- *Develop standards, objectives*
- *Use LLI framework to assist partners interested in certification*
- *Apply LLI throughout the province*

Accomplishments to Date

- *First set of indicators has been developed and refined*
- *Data strategy has been prepared for certain "core" indicators*
- *Draft Objectives have been prepared*
- *C&I workshops held for resource managers across the province, and a Planning Team in Labrador*
- *Discussion Draft of C&I is used as a basis for SFM planning across the Province*

Reports and Publications

- *"Sustainable Forest Management: Criteria and Indicators for Newfoundland (Discussion Draft)," January 1998*
- *A series of newspaper articles on C&I (adapted from ones written by LAB)*

Future Plans

- *Finalize and publish the "Discussion Draft," which will be a "how-to" guide for LLI development and application across the province*
- *Complete and publish the First Report on LLI, summarizing existing data sets*
- *Refine and implement an SFM Plan, incorporating a LLI framework*
- *Develop indicators of community sustainability from two perspectives; using relevant StatsCanada data, and soliciting direct involvement from communities*
- *Attitudinal survey will provide baseline data for a number of indicators related to values, knowledge, understanding and beliefs, as well as forest contributions to the informal economy*
- *Develop presentation on LLI achievements and methodology*
- *Refocus data gathering, monitoring and research activities to address the highest-priority gaps in the First LLI Report*

Fundy Model Forest

High-Priority Objectives

- *Assess LLI for relevance; collect baseline data*
- *Develop forecasts and predictions*
- *Develop Best Management Practices*
- *Assist partners in achieving certification*
- *Guide further research into SFM*
- *Apply outside of the Model Forest area*
- *Provide information on LLI to partners and the public*

Accomplishments to Date

- *A set of practical indicators has been developed and agreed to*
- *Have developed DSS models based on LLI*
- *LLI are being applied by Nova Forest Alliance (an adjunct Model Forest) and other areas*

Reports and Publications

- *"Local Level Indicators Development Process"*

Future Plans

- *Complete the collection of baseline data*
- *Apply DSS models to refine management planning*
- *Two partners (J.D. Irving and the Southern New Brunswick Woodlot Association) are both in the process of adapting Fundy's indicators for their own uses, and incorporating those indicators in their SFM planning and certification initiatives*

Forêt Modèle du Bas-Saint-Laurent

High-Priority Objectives

- *Develop and refine LLI*
- *Use LLI to set thresholds, standards or best management practices*
- *Use LLI to help set management objectives*
- *Guide further research into SFM*
- *Assess the state of the forests, and the impact of the Model Forest*
- *Provide information and outreach to the public*

Accomplishments to Date

- *High level of acceptance of the goals and values identified in Phase I*
- *A solid list of valid indicators*

Reports and Publications

- *Indicator set has been published*

Future Plans

- *Devise practical measuring systems (using GIS remote sensing, Statistics Canada information) that can be used by private forest owners, without requiring extensive field work*
- *Develop a credible "Landscape Index" that can be used as a simple proxy to cover off many diverse biodiversity indicators*
- *Refine indicators (especially socioeconomic indicators) which are influenced by factors beyond the control of forest managers*

Waswanapi Cree Model Forest

High-Priority Objectives

- *The Waswanapi Cree Model Forest partnership has not yet identified its specific priorities with respect to LLI*

Accomplishments to Date

- *Several indicator sets have been developed by or on behalf of the James Bay Advisory Committee on the Environment (a collaborator with the Waswanapi Cree Model Forest), the agency responsible for monitoring the implementation of the treaty between the James Bay Cree and the Governments of Canada and Québec*

Reports and Publications

- *"Toward the Integrated and Sustainable Management of Forestry Activities in Eeyou Astchee: The Development of a Body of Cultural, Social and Economic Indicators," by Carole Lévesque with Sylvie Vincent, on behalf of the Institut national de la recherche scientifique. (This report was developed independently of, and prior to the establishment of, the Waswanapi Cree Model Forest, but is expected to be a relevant reference source for indicators specific to conditions in the Model Forest area)*
- *"A Proposal for the First Approximation of Criteria and Indicators of Sustainable Forest Management for Eeyou Astchee," JBAC, September 1998*

Future Plans

- *Identify the larger-order values and goals that would guide indicator selection*
- *Build the capacity of the SFM Coordinating Committee to recognize the role that indicators could play in helping the Cree protect their values and achieve their goals*
- *Evaluate, refine and validate the relevant indicator sets that have been proposed*
- *Develop indicators related to participation*
- *Put focus on "socio-ecological" indicators, elaborating on traditional ecological knowledge in the cultural context of the James Bay Cree*
- *Develop appropriate qualitative measures*
- *Identify benchmarks relevant to Cree needs and interests*

Eastern Ontario Model Forest

High-Priority Objectives

- *Develop and expand on an initial set of LLI*
- *Use LLI to help set thresholds, targets, objectives*
- *Assess the overall state of SFM*
- *Provide information to decision-makers and the public*

Accomplishments to Date

- *"Starter set" of LLI has been developed*
- *Data is being collected on initial set of LLI; will be incorporated in a State of the Forest Report to be completed by March 31, 1999*

Reports and Publications

- *Keddy, P., Drummond, C, "Ecological Properties for the evaluation of Eastern Ontario forest ecosystems," 1995*
- *Lawn, S., "A Plan for the meaningful incorporation of criteria and local level indicators into State II of the Eastern Ontario Model Forest," 1997*
- *Riley, L., "... a brief analysis of the CCFM criteria and indicators framework and its applicatrion in the eastern Ontario Model Forest," 1997*
- *von Mirbach, M., Johnston, L., "Local Level Indicators for the Eastern Ontario Model Forest," 1998*
- *Johnston, L., "The Eastern Ontario Model Forest's 1998-99 State of the Forest Report," forthcoming*

Future Plans

- *Refine initial indicators; consider adding indicators that were not feasible for the first stage*
- *Address major data gaps - especially forest cover inventory*
- *Distribute the State of the Forest report, and review how it is used and perceived*
- *Identify baseline data and establish threshold levels*
- *Carry out a community science project on LLI*
- *Encourage municipal leaders, schools, to make use of LLI and the State of the Forest report*

Lake Abitibi Model Forest

High-Priority Objectives

- *Develop and refine LLI*
- *Collect data*
- *Guide further research into SFM*
- *Assess the overall state of SFM*
- *Provide information on LLI to decision-makers*

It is hoped that the LLI will influence management planning as well as SFM certification, but these initiatives are the responsibility of the forest managers, not the Model Forest.

Accomplishments to Date

- *Good set of values has been established, based on broad consultations*
- *Two consultants have been engaged to develop usable indicators (for socioeconomic and ecological indicators respectively)*

Reports and Publications

- *A series of newspaper articles describing C&I in non-technical terms (adapted and used by WNF and EON)*

Future Plans

- *Establish an adequate connection between the consultants' reports and the "bottom-up" work on values*
- *Measuring, monitoring and evaluating indicators*

Manitoba Model Forest

High-Priority Objectives

- *Developing and refining LLI*
- *Collecting data, and monitoring (in partnership arrangements)*
- *Incorporating traditional ecological knowledge*
- *Provide information on LLI to Partners*

Use of LLI in management planning or in certification will be the responsibility of the management agencies, rather than the direct responsibility of the Model Forest

Accomplishments to Date

- *Initial set of indicators has been developed*
- *Expert workshops are expected to complete the process of refining initial set of indicators by May 1999*

Reports and Publications

- *Criteria & Indicators Workshop - April 21/98 - Viscount Gort Hotel, Winnipeg*
- *Pine Falls Paper Co. - Discussion Paper - Sustainable Forest Management Plan 2000 - 2009*

Future Plans

- *Land Use studies are underway to incorporate TEK into industry planning*
- *More workshops planned, both for experts and for general interests*
- *Will seek partnership arrangements to carry out monitoring on an ongoing basis, and to encourage agencies to take ownership of the process*
- *Explore the possibility of incorporating LLI into future forest management planning guidelines*

Prince Albert Model Forest

High-Priority Objectives

- *Develop and assess LLI*
- *Collect data on LLI*
- *Use LLI to evaluate management plans and practises*
- *Assess the overall state of SFM and the Model Forest's impact*
- *Provide information to partners, decision-makers and the public*

LLI monitoring is seen as an integral aspect of adaptive management, rather than as a project unto itself

Accomplishments to Date

- *A consultant is currently developing a set of operational indicators for the Prince Albert Model Forest. Indicators from three different sources (CCFM, Province, NAFA) will be evaluated, with recommendations as to monitoring responsibilities. Results are expected shortly.*

Reports and Publications

- *Cheryl L. Drury, Criteria and Indicators of the Prince Albert Model Forest, 1998*

Future Plans

- *Data gathering to begin this field season*
- *Working with Foothills to develop protocols for aquatic indicators*
- *Develop meaningful indicators of public participation*
- *Encouraging one or more Partners to take over the monitoring of LLI on an ongoing basis*

Foothills Model Forest

High-Priority Objectives

- *Develop and refine LLI*
- *Collect data on LLI*
- *Assist partners in using LLI towards certification*
- *Direct and guide further research into SFM*
- *Assess the impact of the Model Forest on SFM*
- *Apply LLI outside the Model Forest area*
- *Provide information to partners, decision-makers and the public*

Accomplishments to Date

- *Draft indicators have been developed, and will shortly (April 99) be finalized*

Future Plans

- *Develop and distribute a regular status report (using a circular, adaptive framework rather than a linear one)*
- *Complete an inventory of existing relevant data sets*
- *Develop and implement a strategy to complete gaps in data, and to put in place a monitoring regime*
- *Data will be reported through existing reporting processes, especially ones that are already required by legislation (Environmental Stewardship reports, provincial State of the Forest Report, State of the Parks Report for Jasper National Park)*
- *Encourage the incorporation of Foothills indicators in management plans, certification initiatives and provincial reporting*

McGregor Model Forest

High-Priority Objectives

- *Develop and assess LLI*
- *Collect data*
- *Develop forecasts, scenarios, management plans*
- *Incorporate traditional forest-related knowledge*
- *Direct and guide further research*
- *Assess the overall state of SFM*
- *Assess the impact of the Model Forest on SFM*
- *Information to partners, decision-makers, the public*
- *Promote training, capacity building and innovation*

Accomplishments to Date

- *A variety of "Case Studies" have been completed or are in development. The current Case Study is projecting five different "interim scenarios," showing future indicator values and landscape conditions based on different management objectives*
- *A stand-alone "Adaptive Management Indicator Workshop" has been developed, applying a methodology for taking stakeholders through the process of identifying objectives related to indicators.*

Future Plans

- *The current Case Study will develop a set of agreed-upon indicators, together with a number of "decision scenarios" that will be used to identify appropriate management strategies resulting in sustainable future forest conditions for the defined set of indicators.*
- *Develop and implement a monitoring protocol*
- *Test the model in an adaptive management planning framework*
- *Refine the model, increasing the sophistication of the projections relating to social values, in future Case Studies*
- *Deliver the Adaptive Management Indicators Workshop to a wide variety of client groups*
- *Involve more partners in the scenario planning process*

Long Beach Model Forest

High-Priority Objectives

- *Develop, assess and refine LLI*
- *Obtain baseline data and put in place a monitoring regime*
- *Use LLI to evaluate management plans and practises*
- *Use LLI to develop forecasts or predictions*
- *Assess the impact of the Model Forest*
- *Provide information to Partners and the public*

Accomplishments to Date

- *A workshop (11/98) provided input in the development of a draft monitoring program*
- *Broad community participation*
- *Studies have been carried out that will help to lead to the development of indicators for: ecological integrity of ephemeral headwater streams; wetlands suitability for amphibians; First Nations values related to wildlife; and road deactivation procedures to preserve water quality.*

Reports and Publications

- *Workplan to Operationalize the Monitoring Program of the Scientific Panel For Sustainable Ecosystem Management in Clayoquot Sound (Draft, Dec. 14/98)*
- *The Ecological Requirements for Riparian Buffers Around Continuously-Flowing, Seasonal and Ephemeral Headwater Streams in Clayoquot and Barkley Sounds*

Future Plans

- *Validate a set of indicators*
- *Set up a monitoring protocol*
- *Link indicator monitoring programs with forestry activities (either by Iisaak Forest Resources Ltd, a First Nations/MacMillan Bloedel partnership, or by a proposed Community Forest Pilot Project in Ucluelet)*

APPENDIX B:

OBJECTIVES MATRIX

		Current Status				Future Activity		
Use, Objective or Application	**Identified as a High Priority**	**Mostly Completed**	**Substantial Progress**	**Initial Work**	**No Activity / N/A**	**Start or Intensify**	**Continue**	**Taper off / Finish**
1. DEVELOPMENT AND MEASUREMENT OF LOCAL LEVEL INDICATORS								
1.1 Develop a set of Local Level Indicators	*WNF, FUN, BSL, EON, LAB, MB, PA, FTH, MCG, LB*	*WNF, FUN, BSL, EON, LAB, MB, FTH*	*WAS, MCG, LB*	*PA*		*FUN, WAS, MCG, LB*		*WNF, BSL, EON, LAB, FTH*
1.2 Fill in gaps in initial set of LLI	*FUN, BSL, EON, LAB, MB, FTH, LB*	*LAB, FTH*	*BSL, MB, LB*	*FUN, WAS, EON, MCG*	*WNF*	*WAS, EON, MCG, LB*	*WNF, FUN, BSL, FTH*	*LAB*
1.3 Assess LLI for practicality, relevance, etc	*WNF, FUN, BSL, LAB, MB, PA, FTH, MCG, LB*		*EON, LAB, MB, FTH, LB*	*WNF, FUN, WAS, FTH, MCG*	*BSL*	*WNF, BSL, WAS, FTH, MCG, LB*	*FUN, EON*	*LAB*
1.4 Collect data on selected LLI	*WNF, EON, LAB, MB, PA, FTH, MCG*	*EON*	*BSL*	*WNF, MB, FTH, MCG, LB*	*WAS, LAB, PA*	*WNF, WAS, MB, PA, FTH, MCG, LB*	*EON*	*BSL*
1.5 Identify baseline data for relevant LLI	*WNF, FUN, LAB, PA, FTH, MCG, LB*		*WNF, FUN, LB*	*LAB, PA, FTH, MCG*	*BSL, WAS, EON*	*WNF, WAS, EON, LAB, FTH, MCG, LB*	*FUN*	

		Current Status				Future Activity		
Use, Objective or Application	**Identified as a High Priority**	**Mostly Completed**	**Substantial Progress**	**Initial Work**	**No Activity / N/A**	**Start or Intensify**	**Continue**	**Taper off / Finish**
2. USE OF LOCAL LEVEL INDICATORS IN ADAPTIVE MANAGEMENT								
2.1 Use LLI to help develop forecasts or predictions	*FUN, MB, MCG, LB*		*FUN, MB, MCG*		*BSL, WAS, LAB, PA, FTH, LB*	*WAS, LAB, PA, FTH, MCG, LB*	*FUN*	*BSL*
2.2 Use LLI to guide the development of different management scenarios	*FUN, MB, MCG*		*FUN, MB, MCG*		*BSL, WAS, LAB, PA, FTH, LB*	*WAS, LAB, PA, MCG, LB*	*FUN, BSL, FTH*	
2.3 Use LLI to review and evaluate management plans and practises	*FUN, MB, PA, MCG, LB*		*FUN, BSL, MCG*		*WAS, EON, LAB, PA, FTH, LB*	*BSL, WAS, EON, LAB, PA, MCG, LB*	*FUN, FTH*	

		Current Status				Future Activity		
Use, Objective or Application	**Identified as a High Priority**	**Mostly Completed**	**Substantial Progress**	**Initial Work**	**No Activity / N/A**	**Start or Intensify**	**Continue**	**Taper off / Finish**
3. USE OF LOCAL LEVEL INDICATORS TO GUIDE FOREST MANAGEMENT IN GENERAL								
3.1 Use LLI to help set thresholds, targets, standards or best management practises	*WNF, FUN, BSL, MB, LB*	*WAS*	*FUN, BSL, MB*	*WNF, MCG*	*EON, LAB, FTH, LB*	*BSL, WAS, EON, LAB, MCG, LB*	*WNF, FUN, FTH*	
3.2 Use LLI to guide the development of specific management objectives	*FUN, BSL, MB, LB*	*WAS*	*FUN, MB*	*WNF, MCG*	*BSL, EON, LAB, FTH, LB*	*WAS, EON, LAB, MCG, LB*	*WNF, FUN, BSL, FTH*	
3.3 Use LLI to help in incorporating traditional forest-related knowledge	*FUN, MB, MCG*	*WAS*	*FUN, MB, MCG*	*FTH*	*EON, LAB, PA, LB*	*WAS, EON, LAB, PA, FTH. MCG, LB*	*FUN*	
3.4 Use of LLI by one or more Partners towards achieving voluntary certification	*WNF, FUN, BSL, PA, FTH*	*WAS*	*FUN, BSL,*	*WNF, MB, FTH, MCG*	*EON, LAB, PA*	*WNF, WAS, EON, LAB, PA, FTH, MCG*	*FUN, BSL*	

		Current Status				Future Activity		
Use, Objective or Application	**Identified as a High Priority**	**Mostly Completed**	**Substantial Progress**	**Initial Work**	**No Activity / N/A**	**Start or Intensify**	**Continue**	**Taper off / Finish**
4. BROADER APPLICATIONS OF LOCAL LEVEL INDICATORS								
4.1 Direct and guide further research into sustainable forest management (SFM)	*FUN, BSL, LAB, MB, FTH, MCG*		*FUN, BSL, FTH*	*WAS, MB, MCG*	*WNF, EON, LAB,*	*BSL, WAS, EON, LAB, FTH, MCG*	*WNF, FUN*	
4.2 Assess the overall state of SFM	*FUN, BSL, EON, LAB, PA, MCG*		*FUN, BSL, EON, FTH, MCG*		*WNF, WAS, LAB, PA*	*WNF, BSL, WAS, LAB, PA, FTH, MCG*	*FUN, EON*	
4.3 Assess the impact of the Model Forest on SFM	*FUN, BSL, PA, FTH, MCG, LB*		*FUN, BSL,*	*WNF, EON, FTH, MCG*	*WAS, LAB, PA, LB*	*WNF, BSL, WAS, LAB, PA, MCG, LB*	*FUN, EON, FTH*	
4.4 Apply LLI outside the Model Forest area	*FUN, PA, FTH, MCG*		*FUN, MCG*	*BSL, FTH*	*WNF, WAS, EON, LAB, PA*	*WNF, WAS, LAB, PA, FTH, MCG*	*FUN, BSL, EON*	

		Current Status				Future Activity		
Use, Objective or Application	**Identified as a High Priority**	**Mostly Completed**	**Substantial Progress**	**Initial Work**	**No Activity / N/A**	**Start or Intensify**	**Continue**	**Taper off / Finish**
5. COMMUNICATIONS AND OUTREACH ABOUT LOCAL LEVEL INDICATORS								
5.1 Provide regular information on LLI to partners	*FUN, LAB, MB, PA, FTH, MCG, LB*		*FUN, EON, LAB, FTH, MCG, LB*	*BSL*	*WNF, WAS, PA*	*WNF, BSL, WAS, EON, LAB, PA, FTH, MCG*	*FUN, LB*	
5.2 Provide strategic information on LLI to key decision-makeing	*FUN, EON, LAB, PA, FTH, MCG*		*FUN, EON, LAB, FTH, MCG*	*BSL,*	*WNF, WAS, PA, LB*	*WNF, BSL, WAS, EON, LAB, PA, FTH, MCG, LB*	*FUN*	
5.3 Provide information and outreach to the general public	*FUN, BSL, EON, PA, MCG, LB*		*EON, FTH, LB*	*WNF, MCG*	*BSL, WAS, LAB, PA*	*WNF, BSL, WAS, EON, LAB, PA, FTH, MCG*	*LB*	

APPENDIX C:
INTERVIEWEES AND SOURCES

Western Newfoundland Model Forest

People interviewed: *Jim Taylor, General Manager*
Len Moores, Chair, C&I Steering Committee

Documents:

- *Phase II Proposal*
- *Evaluation Framework*
- *1998-99 Work Plan*
- *"Sustainable Forest Management: Criteria and Indicators for Newfoundland (Discussion Draft)" January 1998*

Fundy Model Forest

People interviewed: *Peter Etheridge, General Manager*
Louis Lapierre, President

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1997-98 Annual Report*
- *1998-99 Work Plan*
- *"Local Level Indicators Development Process"*
- *"S.N.B. Forest Products Marketing Board: Criteria and Indicators Assessment Report" (October 29, 1998)*

La Forêt Modèle du Bas-Saint-Laurent

People interviewed: *Richard Savard, President, General Manager*
Pierre Belleau, C&I Coordinator

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *Indicator list*
- *"Summary of the Multi-Resource Management Plan for the Est do Lac Témiscouata Territory"*

Waswanapi Cree Model Forest

People interviewed: *Suzanne Hilton, General Manager*

Documents:

- *Proposal (April 1997)*
- *Evaluation framework*
- *"Toward the Integrated and Sustainable Management of Forestry Activities in Eeyou Astchee: The Development of a Body of Cultural, Social and Economic Indicators," by Carole Lévesque with Sylvie Vincent, on behalf of the Institut national de la recherche scientifique.*
- *"A Proposal for the First Approximation of Criteria and Indicators of Sustainable Forest Management for Eeyou Astchee," James Bay Advisory Committee, September 1998*

Eastern Ontario Model Forest

People Interviewed: *Brian Barkley, General Manager*
Lorne Johnson, Consultant

Documents:

- *Phase II proposal*
- *Evaluation framework*
- *1997-98 Work Plan*
- *1997-98 Annual Report*
- *1998-99 Work Plan*
- *Keddy, P., Drummond, C, "Ecological Properties for the evaluation of Eastern Ontario forest ecosystems," 1995*
- *Lawn, S., "A Plan for the meaningful incorporation of criteria and local level indicators into State II of the Eastern Ontario Model Forest," 1997*
- *Riley, L., "... a brief analysis of the CCFM criteria and indicators framework and its application in the eastern Ontario Model Forest," 1997*
- *von Mirbach, M., Johnston, L., "Local Level Indicators for the Eastern Ontario Model Forest," 1998*
- *Johnston, L., "The Eastern Ontario Model Forest's 1998-99 State of the Forest Report," (draft)*

Lake Abitibi Model Forest

People interviewed: *Richard Moore, President*
Wendy Plante, Communications Coordinator

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1997-98 Work Plan*
- *1997-98 Annual Report*
- *1998-99 Work Plan*
- *Newspaper articles on C&I*

Manitoba Model Forest

People interviewed: *Mike Waldram, General Manager*

Written input: *Bill Snell, Pine Falls Paper Company*

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1997-98 Annual Report*
- *"Criteria and Indicators Workshop proceedings" (April 1998)*

Prince Albert Model Forest

People interviewed: *Keith Chaytor, General Manager*
Dwayne Dye, LLIWG representative

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1998-99 Work Plan*

Foothills Model Forest

People interviewed: *Rick Blackwood, General Manager*

Written input: *Bob Udell, President*
Rick Bonar, LLIWG representative

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1997-98 Annual Report*
- *1998-99 Work Plan*
- *"Indicators of Sustainable Forest Management for the Foothills Model Forest" (Report of Workshop, March 24-26, 1998)*

McGregor Model Forest

People interviewed: *Bruce MacArthur, General Manager, Chair of LLIWG*
Dwight Wolfe, SFM Coordinator

Written input: *Jim Burbee, President*

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *1997-98 Annual report*

Long Beach Model Forest

People interviewed: *Eric Schroff, General Manager*
Barb Beasley, research Coordinator

Documents:

- *Phase II Proposal*
- *Evaluation framework*
- *Workplan to Operationalize the Monitoring Program of the Scientific Panel For Sustainable Ecosystem Management in Clayoquot Sound (Draft, Dec. 14/98)*
- *The Ecological Requirements for Riparian Buffers Around Continuously-Flowing, Seasonal and Ephemeral Headwater Streams in Clayoquot and Barkley Sounds*
- *Ucluelet Community Forest Pilot Project Proposal (January 1999)*

General Information

People interviewed: *Dean Toole, CFS Regional Coordinator*
Jacques Robert, CFS Regional Coordinator
Steve Dominy, CFS Regional Coordinator
Bob Newstead, CFS Regional Coordinator
Bill Wagner, CFS Regional Coordinator
Dan Welsh, Director, Model Forest Program
Tom Beckley, Socioeconomic Research Network

Documents

- *"Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators," (March 1995).*
- *"Canada's Model Forest Program: Proposal Guidelines for Phase II," (October 1996).*
- *Canadian Standards Association, "A Sustainable Forest Management System: Guidance Document," (October 1996).*
- *Canadian Standards Association, "A Sustainable Forest Management System: Specifications Document," (October 1996).*
- *"Compendium on Socioeconomic Indicators," (prepared for workshop, September 1997).*
- *WWF International, Living Planet Report 1998: Overconsumption is driving the rapid decline of the world's natural environments, 1998.*
- *"North American Test of Criteria and Indicators of Sustainable Forestry: Final Report," CIFOR, 1998.*
- *"International Model Forest Network Oregon Workshop: Record of Workshop Discussions," March 31-April 5, 1998.*
- *Elizabeth Holmes, "Local Level Indicators and Databases Common Across the Canadian Model Forest Network: A View to Possible Information Sharing and Networking Opportunities," November 1998.*
- *Model Forest Phase II Evaluation Framework information package (January 1999)*
- *Forest Stewardship Council, "Principles and Criteria for Forest Stewardship," January 1999.*
- *"A Network Communications Strategy for Canada's Model Forest Program (Draft)," February 10/99.*